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AGRICULTURAL BULLETIN

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BERMUDA DEPARTMENT OF AGRICULTURE
Gordon R. Groves, Director of Agriculture

THE BOARD OF AGRICULTURE, 1961

The announcement of the new Boards for 1961 revealed that five members of the previous Board of Agriculture have retired and they have been replaced by five people who are well known for their connection with agriculture and horticulture. We would like to express our thanks to the retiring members for their valuable help and guidance throughout the term of their office. At the same time we would like to welcome the new members, with the hope that the excellent relationship which exists between the Board and Department will continue throughout the coming year.

Fortunately there was no change in the Chairmanship and Deputy Chairmanship of the Board, who are Mr. C. Vail Zuill, M.C.P., J.P., and the Worshipful L. R. Selley, M.C.P., respectively.

Of the new members, it is significant to note that Lady Conyers, a very keen horticulturist, is the President of the Garden Club of Bermuda. Mr. T. James, a successful poultry farmer, is President of the Bermuda Farmers' Association, Ltd., while Mr. R. M. Gorham, a prominent Hamilton businessman, is President of the Bermuda Citrus Growers' Association. Both Mr. Norman Moniz and Mr. J. F. Beane have considerable knowledge of farming in Bermuda, for they are both extremely active and industrious farmers.

We, therefore, look forward to another successful year.

G. R. G.

AGRICULTURAL AND HORTICULTURAL EDUCATION

From time to time during the history of the Department of Agriculture, various schemes have been started for the dissemination of agricultural and horticultural knowledge, with varying degrees of success.

In recent weeks a new course under the direction of the Assistant Director has been commenced for children of 13 years and over. The first of these lectures was given on the 14th January, 1961, and will continue every Saturday morning for 13 weeks. It is most encouraging to record that 25 children

from various schools throughout Bermuda attended the first lecture. The course will include lectures and demonstrations on poultry and rabbits, soils, elementary botany, vegetable gardening, fruit culture, plant pests and diseases, plant propagation, flower gardening, the care of trees and shrubs, and the care of cattle and goats.

In addition to the above course of lectures, the Department of Agriculture, with the approval of the Board of Agriculture, has prepared a horticultural training scheme for boys of school leaving age. Those who are accepted in this scheme will undertake to work for a four-year period in the Department of Agriculture, and during this period will spend at least six months in each section of the Department. A reasonable subsistance allowance will be paid to each trainee. A course of lectures will also be given by the principal officers of the Department. The syllabus will include, plant propagation and general nursery work, care of plant collections, plant protection, elementary botany and soil chemistry, landscape construction, turf management, fruit flower and vegetable culture. At the conclusion of the course a Certificate of Proficiency will be awarded.

It is hoped that those who successfully complete the training will be qualified to take positions of responsibility in the Department of Agriculture, and also positions in the management of hotel gardens and other organisations requiring qualified persons for the maintenance of gardens and estates. It must be understood, however, that the Department will not be in a position to guarantee employment on completion of the training period, but every assistance will be given to those who have shown keenness, natural aptitude and ability during the course to find suitable employment.

G. R. G.

THE TWENTY-SIXTH AGRICULTURAL EXHIBITION

Preparations are now in full swing for the twenty-sixth Agricultural Exhibition to be held on the 20th, 21st and 22nd April. All farmers and gardeners are, therefore, asked to bear these dates in mind, because it is of the utmost importance to have exhibits of good quality for this event. Every effort is being made to produce a show at least as good, and if not better, than its forerunners. The co-operation of all our supporters is again sought to achieve this end.

In looking through some of the comments made by last year's judges, we find that Mr. Gordon Scott and Mr. C. H. Henning who judged the flowers on that occasion, made some constructive suggestions relative to the floral exhibits. These comments are published here for the guidance of flower exhibitors this year.

JUDGES COMMENTS — FLORAL EXHIBITS

Bermuda Agricultural Exhibition, 1960

"The quality of the floral exhibits on the whole was fair to good. No doubt the wind storm prior to the show caused considerable damage to many potentially good blooms. A second prize was often the highest award made

due to the fact that it was not possible to conscientiously give a first. It is important to realise that the condition of the flowers at the time of judging is what counts. Thus, no matter how beautiful they were the night before, or how lovely they will be tomorrow, exhibits are judged on how they appear at the time of judging.

"It is well to remember that the process of elimination is adopted by a good judge in looking for faults which will enable him to reduce the number of entries upon which final concentration may be made in awarding prizes. In this way, it is the absence of faults that finally scores, whether single specimens or large collections are being judged.

"Entries made by children were awarded prizes as a token of appreciation of effort and to stimulate interest, as well as to give them encouragement. Even if the parents assisted in the preparation of exhibits, children should be considered as exhibitors-in-training for the future.

"Many exhibitors of cut flowers lost valuable points because the following considerations were not taken into account when gathering the flowers in the garden or staging for competition —

Uniformity and **Quality.** These two important factors cover a wide field in exhibiting plant material and may be briefly condensed as follows to indicate **where some points were lost:**

(a) **Stems.** A wide difference in the stem length of each bloom, when they should be approximately the same. Twisted or crooked stems lose points, also differences in thickness or stems too weak to support flowers properly. Avoid stems which are too coarse, too short or damaged. Having an incorrect number of stems, according to requirements of the class, results in entries being disqualified.

(b) **Leaves.** Surfaces of leaves dirty with soil, insect or disease preventing sprays or dusts. Size of leaves too small, whole leaf or tips and edges discoloured or damaged by insects, diseases, wind, sunburn, sprays, fertilizers, etc. Colour of leaf not healthy in appearance. The absence of, or too many leaves that should be present on the stem of flowers. Presence of old and dying leaves.

(c) **Flowers.** Too old, fading, losing good colour, wilting, petals starting to curl at the edges. Too many buds and not enough individual flowers open per stem. Blooms too small. Flowers damaged — caused by similar conditions as stated with damage to leaves. Presence of dead flowers or small portions of stems and stubs visible where flowers were removed. Naturally imperfect flowers — petals or other parts of the flower missing.

"**Pot Plants** Orchids included) —

"Cleanliness is most essential with orchids. The leaves should be sponged every two or three weeks. A periodical scrubbing of pots and cleaning of wooden receptacles will help to reduce the attacks of many insects. Flowering pot plants should be exhibited in a well-groomed condition, free of insects, weeds and debris.

"**Avoid** exhibiting in dirty pots or containers, presence of weeds in compost, rubbish in top of the soil or dead portions of growing plants not removed. The plant itself may need a 'good cleaning-up'."

GARDEN CALENDAR FOR FEBRUARY

Flower Garden

A reminder is made concerning the propagation of Poinsettia's for flowering next December. Mention was made of this point in our January Calendar. However, due to the prolonged flowering this year, it was not practical to take cuttings in January. As soon as flowering ceases, therefore, propagation should commence without delay.

Flower seedlings planted out in November and January should by now be established, and regular cultivation will be necessary for satisfactory results. The hoe should be kept going constantly, assuring that the top soil is kept in a loose, open and friable condition. Taller growing subjects should be staked and tied as required.

Gladiolus and Montbretia may be planted out now, for general display and cut flower purposes. Successional plantings of Gladiolus made from now until the end of March, on a weekly or fortnightly basis, will provide a succession of bloom into June. Whilst Gladiolus require good soil conditions, immediate contact with fresh organics may cause various soft-rots in the corm. Likewise, the use of artificial fertilizers should be avoided, as Gladiolus show varying susceptibility to the chemicals. Where fresh organics, such as compost, manure or seaweed are used, they should be dug in, well below planting level. Corms should be planted from five to six inches deep, depending upon size. When grown for cut flower purposes, they may be supported by earthing up as growth proceeds. For finest results, individual staking and tying is desirable.

Where fresh planting of trees and shrubs is planned, then land preparation should commence now. Young plants set out earlier, should be checked to see that January winds have not worked them loose in the soil.

Exhibition

With the exhibition now only two months away, intending exhibitors should be selecting the flowers and vegetables from which those prize winning entries will come. The fullest attention should be paid to their requirements, even if the time given to this endangers domestic harmony.

Floral Pageant

Sowings made during the early part of the month, of Calendula, French and African Marigold, will provide flowering material for this important event.

This seed should be sown in prepared beds. When large enough, the seedlings may be thinned down, allowing room for full development. Transplants may receive too big a check, to allow flowering in time.

D. J. M.

THE REMARKABLE INSECT

No matter how one feels about insects, and certainly few people have anything but disdain for them, there is no denying that insects are truly

remarkable animals. As a result of a combination of adaptability and persistence, coupled with a tremendous reproductive potential, the insect has established itself in a very dominant position in the Animal Kingdom. If numerical superiority was to be used as a measure of success then certainly the insects would have to be considered the world's most successful animal. At the present time zoologists are undecided as to the number of different kinds of animals on the earth. A rough estimate would put the figure at one million different species of animals. Zoologists have agreed, however, that at least 75% of the known kinds of animals are insects. This proportion has held steady for the past century or more. There are, then, far more kinds of insects than there are kinds of all other animals put together. To further illustrate the dominant position that the insects hold in this respect it can be pointed out that the group of insects known as beetles — typified by the june beetles and lady beetles — this group alone contains more different species than all other non-insect animals combined.

If we consider numbers of individuals rather than numbers of species or kinds the insects again come out on top of the multicellular animals. When you realize that an average ant colony may contain as many as two or three hundred thousands individuals, that many termite colonies contain several millions of individuals and even the common bee-hive houses on the average twenty to thirty thousand workers, then it is not difficult to appreciate the vast numbers of insects which are present on earth.

Insects can and do exist in virtually every type of environment. They are to be found in the frozen wastes of the North as well as in the Tropics; on the water and in the water; on the surface of the ground and in the soil; on plants and animals as well as in plants and animals. Not only can insects live virtually anywhere they can eat virtually anything. Animal and plant products are, of course, favoured food but such unlikely materials as lead cabling, spices, red peppers and even the poison strycnine are known to be eaten by insects.

The economic importance of insects to man should not be underestimated. Insects are continually at work chewing, sucking, biting and boring away at man's crops, animals, timber, warehouses, homes and even at man himself. It is estimated that in the United States alone crop damage caused by insects amounts to many billions of dollars annually. To this must be added the damage inflicted upon livestock and non-agricultural commodities. The final figure is so astronomical as to be incomprehensible.

Through the centuries people have been plagued by insects and have died by the millions as result of insect-borne diseases. There are estimated to be over 10,000 kinds of insects and mites capable of inflicting man directly or indirectly with disease. While man is gradually gaining mastery of disease causing insects the fight is a very costly one in terms of loss of life as well as money.

Not all of the economic significance of the insects must be entered upon the balance sheet in red ink, however. Man has profited from the insects in many ways. The products from honey bees are valued at many millions of pounds annually; the pure silk industry is still a valuable one despite the prominence of so many synthetic fibres; the shellac and dye industries also utilize the products or by-products of insects. More difficult to evaluate but even

more important is the role that insects play as pollinators of plants. Without the insects many crops which are of great importance to man would be difficult, if not impossible, to grow. Included in this group are most of the legume crops, such as peas, beans and clovers, many fruit crops like apples, pears, peaches, and to a lesser extent citrus, all of the melon family, cotton, tomatoes and many more.

There is no question then that the insects have enjoyed tremendous success on earth and that they exert an influence upon man which is far greater than most people realize.

I. W. HUGHES,
Assistant Director of Agriculture.

SOIL NITROGEN

The growing plant requires many types of food in order to make normal growth, and a balanced diet is essential in this respect. However, if one element had to be singled out as the most essential to the well-being of plants, nitrogen would be this element. Nitrogen is so necessary to the growth and reproduction of both plants and animals that all life would certainly cease to exist without it.

In all soils there is a very considerable intake and outgo of nitrogen in the course of a year; there are also many complex transformations of nitrogen from one form to another. Some of the reactions involving nitrogen which take place in the soil can be influenced to some degree, by man; others are completely out of man's control.

In most soils, including those of Bermuda, nitrogen is available in only limited quantities. Nitrogen which is available for plant use is easily leached out of the soil — this presents an additional problem when one is trying to increase the supply of available nitrogen.

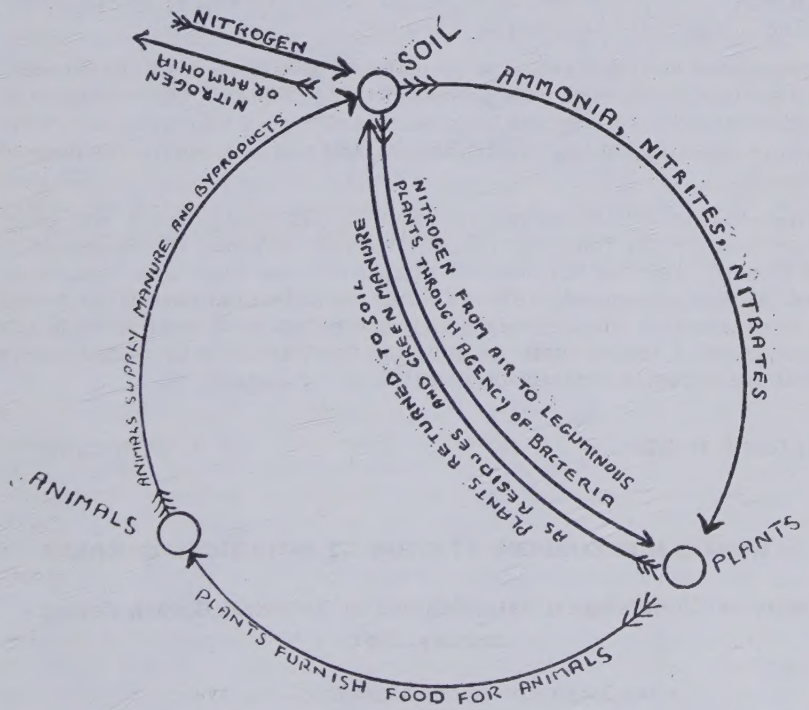
The mineral compounds of the soil, like calcium, magnesium, iron, and zinc originated from the decomposition of original rock material — in the case of Bermuda soils from aeolian limestone. Soil nitrogen on the other hand, must all be derived from the air. There is, of course, a tremendous supply of free nitrogen in the atmosphere (80 per cent by volume). Plants unfortunately cannot use this free nitrogen. It is only after the elemental nitrogen has been "fixed" or combined with other elements, such as oxygen and hydrogen in particular, that it can be used by plants.

There are two ways in which nitrogen can be combined with other elements like hydrogen and oxygen: the first is by natural means, the second by artificial means. Lightning discharges unite nitrogen and oxygen to form oxides of nitrogen (oxygen in combination with nitrogen). These oxides are then carried into the soil, in combination with rainwater or snow. The amount of fixed nitrogen which reaches the soil in this manner is very small, however. While plants cannot use free nitrogen from the air, certain micro-organisms, particularly bacteria and certain fungi, can. It is the life function of many free living micro organisms in the soil to abstract nitrogen from the air, and transform it into fixed-nitrogen compounds which can then be used by plants. In addition, there are certain bacteria which live in close association with the

roots of leguminous plants like peas, beans, and clovers which fix free nitrogen directly into forms which can be used by plants. Ninety per cent or more of the nitrogen which is converted to forms useable by the plants is converted by the free living soil micro-organisms and the bacteria which live in the roots of legumes. A further source of soil nitrogen is decaying animal and plant produce as well as the excrement from animals. This form of nitrogen is continually being added as plants and animals die and are returned to the earth.

In order to help nature to keep the supply of soil nitrogen at a high level, man has developed ways of combining gaseous nitrogen with oxygen, hydrogen and other elements. These man-made fertilizers, such as sulphate of ammonia and nitrate of soda, are now widely used.

The many and varied reactions in which nitrogen is involved, either in the soil, or directly before it enters the soil, are referred to as the Nitrogen Cycle. The following illustration (taken from the 1938 Year Book of Agriculture, after Blair) will indicate the Nitrogen Cycle.



THE NITROGEN CYCLE

I. W. H.

ON THE FARMS

Most of the fall crop of potatoes has now been lifted. Yields were not excessively high, but were a little better than is normally the case for this crop. Most farmers got returns of four or five to one. This is about all that

can be hoped for at this time of year. At the Botanical Gardens the potato trial plots have been dug, and are being replanted with potatoes representative of the spring crop. The triumph potatoes yielded very well in these trial plots, and would have done even better had the weather been more kind. It is expected that well over 2000 barrels of potatoes will be planted for the present spring crop. The last of these should be in the ground by the 15th or 20th of this month. It is very poor practice to plant potatoes in Bermuda later than the middle of February. This is inviting trouble from the potato tuber moth as well as the droughts of May.

There is still some local cauliflower available, but not in the abundance of December and January. The quality of cauliflower this season has been exceptionally good with produce from the farm of Mr. Malcolm Hollis and Mr. Manuel Branco Tavares being outstanding.

Carrots are still plentiful, and will remain so for three more months. Tomatoes, which have been scarce one week and plentiful the next, should be available in more reasonable quantities during the first half of February, but will tend to taper off by the end of the month.

There are several fields of sweet corn already well along, and further acreage either just planted or in the process of being planted. This is much the case with the cucurbits: Squash, pumpkins, cantaloupe and cucumbers were planted in small quantities, during January, but will be more heavily planted this month.

Grapefruit is available in quantity, and the quality is as usual, very good. Growers would profit from studying the manner in which the Sunningdale Farm prepares fruit for the marekt. Grapefruit from this farm is carefully graded, washed and waxed, with the result that the final pack is far better than most imported fruit. There is no question but what local citrus is of a superior internal quality than the imported fruit, and it is up to the grower to see that his fruit is attractively presented on the market.

CARLISLE HOLLIS. I. W. HUGHES.

WEATHER RECORDING STATION AT BOTANICAL GARDENS

Summary of Climatological data obtained at Botanical Garden during January, 1961

Mean Maximum temperature 67.6	
Mean minimum temperature 58.4	
Mean monthly temperature 63.0	
Absolute maximum 73.3	on January 15th
Absolute minimum 52.1	on January 26th
Rainfall 4.81 inches	
No. of rain days. 18	